

OFFICIAL AMENDMENT
Application 09/925,059
August 25, 2005
Reply to Office Action of May 25, 2005

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listing of claims in the application.

1-43 (canceled)

44. (new) An image fusing system comprising:

a camera having:

a common aperture arranged to allow target radiation to enter said camera along a common optical axis;

a beam splitter arranged to receive said target radiation passed through said common aperture and to split said target radiation into a first spectral band and a second spectral band which is different from said first spectral band;

a first sensor arranged to receive said radiation in said first spectral band and to provide a first optical output representing a first optical image of said radiation filtered into said first spectral band; and

a second sensor arranged to receive said radiation in said second spectral band and to provide a second optical output representing a second optical image of said radiation filtered into a second spectral band;

a beam combining device arranged to optically fuse said first optical output from said first sensor and said second optical output from said second sensor into a third optical output; and

a viewer for viewing said third optical output; wherein:

said first sensor and said second sensor are aligned along said common optical axis such that parallax between said first and second sensors is substantially eliminated and said camera and said viewer are aligned along said common optical axis such that parallax between said

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camera and said viewer is substantially eliminated.

45. (new) The image fusing system according to claim 44, further comprising:

a common lens as said common aperture that is transmissive to at least said first and second spectral bands,

a first relay lens in a first optical path between said beam splitter and said first sensor, wherein said common lens combines with said first relay lens to correct aberrations in said first spectral band; and

a second relay lens in a second optical path between said beam splitter and said second sensor, wherein said common lens combines with said second relay lens to correct aberrations in said second spectral band.

46. (new) The image fusing system according to claim 45, wherein:

said first spectral band comprises the visible and/or near infrared (VIS/NIR) band of said radiation;

said second spectral band comprises the long infrared (LIR) band of said radiation;

said common lens passes radiation from said visible to said long infrared;

said first relay lens comprises glass, wherein said first relay lens combines with said common lens to correct aberrations within the VIS/NIR band of about 0.4 microns to about 1.1 microns; and

said second relay lens comprises infrared material, wherein said second relay lens combines with said common lens to correct aberrations in the LIR band of about 8 microns to about 12 microns.

47. (new) The image fusing system according to claim 44, wherein:

said beam splitter comprises a common beam splitter as said common optical aperture to

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split said radiation into a first optical path and a second optical path;

a first objective lens in said first optical path between said beam splitter and said first sensor to filter radiation into said first spectral band and to send said first spectral band of radiation to said first sensor; and

a second objective lens in said second optical path between said beam splitter and said second sensor to filter radiation into said second spectral band and to send said second spectral band of radiation to said second sensor.

48. (new) The image fusing system according to claim 44, wherein:

said first sensor comprises at least one of a charge coupled device or an image intensifier for generating said first optical output in visible and/or near infrared;

said second sensor comprises an infrared focal plane array (FPA) and a display to convert an infrared output of said FPA to a visible image; and

said beam combining device is arranged to optically fuse said first optical output and said second optical output for viewing.

49. (new) The image fusing system according to claim 48, wherein:

said first spectral band comprises a visible and/or near infrared (VIS/NIR) image of said radiation from said first sensor;

said second spectral band comprises a long infrared (LIR) image of said radiation from said second sensor; and

said beam combining device comprises a narrow band filter to pass substantially all green light from said first sensor at a peak wavelength of near 0.55 micron with a bandwidth of near ± 0.01 micron, and to reflect substantially all other visible light from said display of said second sensor; and to fuse said VIS/NIR and LIR images.

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50. (new) The image fusing system according to claim 44, wherein:

said first sensor includes a first electronic output and said first optical output simultaneously representing a first electronic image and said first optical image of said radiation filtered into said first spectral band;

said second sensor includes a second electronic output and said second optical output simultaneously representing a second electronic image and said second optical image of said radiation filtered into said second spectral band; and
further comprising:

a processor is arranged to electronically fuse or combine said first electronic output and said second electronic output into a third electronic output;

a display device is arranged such that said first electronic output of said first sensor, said second electronic output of said second sensor, and said third electronic output from said first and second sensors may be selectively displayed; and

said beam combining device is arranged to optically fuse or combine said first optical output and said second optical output into a third optical output for viewing.

51. (new) The image fusing system according to claim 50, further comprising:

a transmitter capable of wirelessly transmitting said first, second, and third electronic outputs to a remote receiver.